



Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number:

0 157 835

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(12)

EUROPEAN PATENT SPECIFICATION

- (45) Date of publication of patent specification: 01.06.88 (51) Int. Cl.⁴: B 42 D 9/04, G 07 F 7/10
- (21) Application number: 84903609.0
- (22) Date of filing: 24.09.84
- (88) International application number:
PCT/US84/01532
- (54) International publication number:
WO 85/01478 11.04.85 Gazette 85/09

(54) AUTOMATIC DOCUMENT PAGE TURNING APPARATUS.

(30) Priority: 30.09.83 JP 180963/83

(43) Date of publication of application:
16.10.85 Bulletin 85/42

(45) Publication of the grant of the patent:
01.06.88 Bulletin 88/22

(84) Designated Contracting States:
DE FR GB

(58) References cited:
GB-A-2 103 585
GB-A-2 104 493
US-A-4 280 036

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EP 0 157 835

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Description**Technical Field**

This invention relates to document page turning apparatus of the kind including feeding means adapted to feed a multiple page document along a feed path to a turning station, document bowing means adapted when actuated to engage and move a document positioned at said turning station to a bowed configuration, turning means adapted to engage the top page of a bowed document and operable to move said top page to a partially open position adjacent said turning means, and control means adapted to operate said feeding means to feed the document along said feed path such that said turning means engages and moves the partially opened top page to a fully open position.

The invention was a particular application where the multiple page document is a passbook. By a passbook therein is meant a book having a relatively thick cover and relatively thin pages, suitable for recording the transactions, such as deposits and withdrawals, of a customer of a financial institution such as a bank.

Background Art

Document page turning apparatus of the kind specified in known from U.S. Patent No. 4,280,036 which discloses an automatic bank depositing machine wherein the amount of cash deposited by a customer in the machine is automatically recorded at the appropriate location in a passbook which is manually inserted into the machine in an open condition and is automatically fed completely into the machine for printing. The known apparatus includes an automatic page turning mechanism which is effective to turn over a page of the passbook when that page is full and further printing is required, the passbook being fed back to the printing position for further printing on the new page.

The page turning mechanism disclosed in said U.S. Patent includes friction rollers which are pressed against the passbook when in an open position while clamp means spaced from the rollers rigidly hold the passbook stationary. Support pins penetrate beneath the uppermost leaf of the open passbook, which has been partially lifted by the rotation of the friction rollers. The passbook is then moved such that the partially open page is fully opened by contact with the support pins. The known apparatus has been found to have the disadvantage that the cover of a passbook cannot be turned due to the thickness and stiffness thereof and the passbook has to be inserted into the printing apparatus by the clerk in an open condition. This limitation prevents the known mechanism from being used in Automatic Teller Machines (ATM's).

Document page turning apparatus of the kind specified is known from GB—A—2 103 585. This known page turning apparatus is incorporated in an automatic cash withdrawal machine for use in a bank. A customer inserts his passbook into the

machine in an open condition, whereafter the machine reads prescribed information concerning the customer from the passbook and prints relevant information concerning the withdrawal transaction on the open page of the passbook. When the last line of a page has been printed, the passbook is moved to the page turning apparatus, which turns the completed page to make a new page available for printing. The known apparatus also has the capability of turning a page of the passbook in a backward direction if two or more pages are turned in error in a forward direction or if the passbook is inserted in an open condition at an incorrect page. However, this known apparatus also has the disadvantage that there is no provision for turning the cover of the passbook, which has to be inserted into the machine in an open condition.

Disclosure of the Invention

It is an object of the present invention to provide document page turning apparatus of the kind specified wherein the aforementioned disadvantage is alleviated.

Therefore, according to the present invention, there is provided page turning apparatus of the kind specified, characterized in that said document is a passbook having a relatively thick cover and relatively thin inner pages, in that sensing means coupled to said control means are provided adjacent said feed path, adapted to sense whether said passbook is in a closed or an open condition, and in that said control means is adapted to cause said drive plate member to be operated with a relatively high or a relatively low pressure level according as said passbook is in a closed or an open condition.

It will be appreciated that in apparatus according to the invention, documents such as passbooks can be fed to the turning station in a closed condition thereby permitting the top page (cover) of the document to be turned.

An embodiment of the invention, which will be described in more detail hereinafter, comprises a mechanism for turning over the cover and the inner pages of a passbook of other type of multiple-page document which includes a guide chute along which a closed passbook is transmitted to a page turning station, a page turning roller positioned adjacent the guide chute at the page turning station which is adapted to be rotated in a page-turning direction, a drive member

mounted adjacent the guide chute opposite the page turning roller which is movable in a direction to engage and move the passbook into a bowed position in which the top page or cover of the passbook is engaged by the page turning roller whose operation turns the cover or the page of the passbook to a partially open position and then to a fully open position upon movement of the passbook along the guide chute and control means for controlling the amount of force exerted by the drive member on the passbook whereby the force applied to the drive member varies depending on whether the cover or another page of the passbook is to be turned.

Brief Description of the Drawings

One embodiment of the present invention will now be described by way of example, with reference to the accompanying drawings, in which:

Fig. 1 is a side view of the page turning apparatus of the present invention showing the linkage arrangement for moving the drive member into engagement with the passbook;

Fig. 2 is a partial side view of the page turning apparatus of Fig. 1 showing the location of the passbook prior to a page turning operation;

Fig. 3 is a partial side view of the page turning apparatus of Fig. 1 showing the drive member in an actuated position and the passbook in a bowed configuration;

Fig. 4 is the same view as Fig. 3 showing the position of the page turning roller after the cover or page member has been rotated to an engaging position with the page turning roller support member;

Fig. 5 is the same view as Fig. 4 showing the passbook after its initial movement resulting in the page turning roller turning over the cover or page member of the passbook to a partial open position;

Fig. 6 is the same view as Fig. 5 showing the position of the passbook after the cover or page member has been turned to an open position;

Fig. 7 is a block diagram of the control system of the page turning apparatus;

Fig. 8 is a schematic diagram of the control circuit for varying the force exerted on the passbook by the drive member;

Figs. 9A and 9B taken together disclose a detailed flowchart of the page turning operation.

Best Mode for Carrying Out the Invention

Referring now to Fig. 1, there is disclosed a side view of the page turning apparatus of the present invention which is indicated generally by the numeral 20 and which includes a page turning roller 22 rotatably mounted on a support member 24 in which the roller 22 is operated by a conventional drive means such as a motor 23 (Fig. 7). The roller 22 is mounted adjacent a plurality of guide plate members 26, 27 and 28 which form a guide chute 30. The guide plate member 26 is slidably mounted for longitudinal movement to the dotted position shown in Fig. 1 by a drive mechanism (not shown) operated by a drive member 27 (Fig. 7). Mounted adjacent the guide chute 30 are a plurality of rubber drive rollers 32-36 inclusive operated by a conventional motor-driven belt (not shown) in which each of the drive rollers coacts with an associated pressure roller 38-42 inclusive in a manner that is well-known in the art to move a closed passbook along the guide chute 30.

Located adjacent the guide plate member 28 opposite the page turning roller 22 is a U-shaped or arcuate drive plate member 44 having a depending support portion 46 to which is rotatably mounted by means of a stud 48 on end of an arm member 50. The other end of the arm member 50 is fixed to a rotatably mounted shaft

member 52 to which is also fixed one end of a second arm member 54. The other end of the arm member 54 is rotatably connected to one end of a link member 56 by means of the stud 58. In a similar manner, the link member 56 is rotatably connected by means of a stud 60 to one end of a lever member 62 which in turn is rotatably mounted on a fixed shaft member 64. The other end of the lever member 62 is rotatably secured by means of a stud 66 to one end of an armature member 68 associated with a solenoid 70. Also engaging the stud 66 is one end of a spring member 71 for normally returning the lever member 62 to its home position. As will be described more fully hereinafter, energizing of the solenoid 70 results in the upward movement of the drive plate member 44.

Referring now to Figs. 2-7 inclusive, there is shown side views of the page turning mechanism during a page turning operation together with the control unit for operating the page turning mechanism. As shown in Fig. 2, a closed passbook member 72 with its bound edge portion orientated in the forward direction is driven by the feed rollers 32 and 34 in a left-to-right direction as viewed in Fig. 2. The passbook member 72 is sensed by a pair of photodetectors 74, 76 which cooperate with a light source 78 in a manner that is well-known in the art to sense the leading and trailing edges of the passbook member 72. Signals generated by the photodetectors 74, 76 are transmitted to a control unit 80 (Fig. 7) which detect whether the passbook member 72 is in an open or closed condition by measuring the time interval between the operation of the photodetectors 76 and 74. The control unit 80 comprises a microprocessor and firmware which control various portions of the page turning mechanism in a predetermined order in response to receiving control signals transmitted from the photodetectors 74, 76 together with signals generated from an operator's keyboard 118 (Fig. 7) or transmitted over line 120 from an external device such as an ATM. As will be described more fully hereinafter, detecting the closed or open position of the passbook will control the amount of pressure that the drive plate member 44 will exert on the passbook 72 upon movement of the drive plate member into engagement with the passbook member.

In response to the signals generated by the photodetectors 74, 76 a reversible drive motor 27 (Fig. 7) operatively connected to the guide plate member 26 (Fig. 1) by any conventional means such as a rack and pinion mechanism will slide the guide plate member 26 to the left as shown in Fig. 3 removing the guide plate member from a blocking position with respect to the drive plate member 44. After the guide plate member 26 has been moved to an actuated position (Fig. 3), the control unit 80 will output control signals over line 88 to a drive plate control unit 90 which outputs energizing signals to the solenoid 70 (Figs. 1 and 7). The operation of the solenoid 70 results in the movement of the armature member 68 to the

right as viewed in Fig. 1 actuating the linkage arrangement connecting the drive plate member 44 resulting in the movement of the drive plate member 44 in an upward direction engaging the passbook member 72. The passbook member 72 at this point has its bound end engaged and held by the drive roller 34 and the pressure roller 40. Movement of the drive plate member 44 moves the passbook member 72 into a curved or bowed configuration (Fig. 3) allowing the cover or top page member 102 to engage the page turning roller 22. At this time, the roller 22 is being rotated in a counterclockwise direction by the motor 23 (Fig. 7) under the control of a control unit 94 which in turn is operated in response to control signals transmitted over line 96 from the control unit 80.

Rotation of the page turning roller 22 results in the cover or top page member 102 being rotated to a position which intercepts a light beam 103 outputted from a light source 104 (Figs. 1 and 3) and which is normally detected by a photodetector 106. The interception of the light beam 103 by the cover member or top page member 102 results in the photodetector member 106 outputting a signal to the control unit 80. The control unit 80 in response to receiving the signal from the member 101 will output a control signal to the drive plate control unit 90 which deenergizes the solenoid 70 allowing the spring member 71 (Fig. 1) to return the armature member 68 to its home position moving the drive plate member 44 in a downward direction (Fig. 4). The roller member 22 continues rotating in a counterclockwise direction for a predetermined time period rotating the cover or top page member 102 to a partially-open position adjacent the roller support member 24 (Fig. 4). After the predetermined time period has elapsed, the control unit 80 will output appropriate control signals to the page turning roller control unit 94 (Fig. 7) which disables the motor 23 stopping the rotation of the page turning roller member 22.

The control unit 80 will also output control signals to the feed roller control unit 108 (Fig. 7) which operates a stepping motor 110 which in turn operates a belt drive system (not shown) for rotating the feed rollers 32, 34 (Fig. 5) in a counterclockwise direction. This rotation of the feed rollers results in the leftward movement of the passbook member 72 as viewed in Fig. 5 resulting in the stationary page turning roller 22 rotating the partially opened cover member 72 to a completely open position (Fig. 6). The rotation of the cover or top page member 102 to an open position enables the photodetector 106 (Fig. 3) to generate a signal which is transmitted to the control unit 80. In response to receiving this signal, the control unit 80 will output the appropriate control signals to the guide plate control unit 84 (Fig. 7) which operates the motor 86 to move the guide plate member 26 to its home position (Fig. 1). At this time, the feed rollers 112, 32-36 inclusive (Fig. 6) are operated to drive the open passbook member 72 through the guide chute 30

to a position adjacent a printing mechanism (not shown) where printing on the open cover member 102 occurs. For a complete description of the processing of the passbook member 72, reference may be made to the previously cited international application.

Where an inner page member of the passbook member 72 is required to be turned, the passbook member is again positioned adjacent the drive plate member 44 (Fig. 2) and the sequence of operation of the drive plate member 44 and the page turning roller 22 is repeated. In this instance, the pressure exerted by the drive plate member 44 on the passbook member 72 is reduced in a manner to be described more fully hereinafter. Where alternative printing operations are to occur on either side of the same page or alternate pages of the passbook member, the passbook member is positioned adjacent the drive plate member 44 with the bound edge portion of the passbook member held between the feed roller 32 and the pressure roller 38 (Fig. 2). A drive member 114 (Fig. 7) engaging the page turning roller 22 is energized by signals transmitted from the page turning roller drive control unit 116 (Fig. 7) as a result of the control unit 80 receiving control signals from either the operator control unit 118 or over line 120 from an external control device. Energizing of the drive member 114 results in the movement of the page turning roller member 22 to the dotted position shown in Fig. 1 adjacent the pressure roller 40. The control unit 80 will output control signals to the page turning roller control unit 94 resulting in the energizing of the roller drive motor 23 for rotating the page turning roller member 22 in a clockwise direction enabling the page of the passbook engaged by the roller 22 to be turned in a clockwise direction to an open position upon the subsequent movement of the passbook to the right as viewed in Fig. 1.

Referring now to Fig. 8, there is shown a schematic diagram of a control circuit found in the drive plate control unit 90 (Fig. 7) for varying the pressure applied by the drive plate member 44 on the passbook member 72. Included in the circuit are cascaded pairs of NPN transistors 122 and 124. When the cover or top page member 102 of the passbook member 72 is to be turned to an open position, the control unit 80 (Fig. 7) transmits an energizing signal over line 126 in addition to an enabling signal over line 127 turning on the pair of transistors 122 which enables current to flow from a 24 volt power supply through the solenoid 70 at a level producing a force which is applied to the passbook member 72 by the drive plate member 44 corresponding to a power level as follows.

$$W = 24V/20 \times 24V = 28.8W$$

Where an inner page member of the passbook member 72 is to be turned, an energizing signal is transmitted over line 128 which turns on the cascaded pair of transistors 124. The current flowing through the solenoid 70 produces a

pressure force on the passbook member 72 in accordance with the following power level.

$$W = 24V/(20 + 22) \times 24V = 13.7W.$$

It is obvious that these values are exemplary and other values can be selected in accordance with the thickness and stiffness of the cover and the inner pages of the passbook member or other documents being processed.

Referring now to Figs. 9A and 9B inclusive, there is disclosed a flowchart of the page turning operation. When the passbook member 72 is initially sent to the page turning mechanism at the start (block 130) of the operation, a signal initiating the operation of the page turning mechanism (block 132) is transmitted either from the operator control unit 118 (Fig. 7) or over line 120 from an external control device such as a keyboard on an ATM. The generation of the signal results in the microprocessor in the control unit 80 generating a cover turn flag (block 134) enabling the feed roller control unit 108 (Fig. 7) operating the stepping motor 110 to feed (block 136) the passbook member 72 to a page turning position (Fig. 2). The guide plate member 26 is then removed (block 138) from a blocking position adjacent the drive plate member 44. The member 44 is then moved to a position engaging the passbook member (Fig. 3) upon the energizing of the solenoid 70 (block 140) in a high power mode. If the passbook member 72 is in an open position, the steps of starting (block 142), initiating (block 144) an operation, feeding (block 146) the passbook member to a page turning position, opening (block 148) the guide plate member and energizing (block 150) the solenoid 70 is repeated except that the energizing of the solenoid occurs in the low power mode.

After the passbook member 72 has been moved into engagement with the page turning roller 22 (Fig. 3), the roller is operated (block 152) to bow the cover or page member 102 of the passbook member and the photodetector 106 is checked to see if a signal has been generated (block 154) indicating the interception of the light beam 103 by the curved cover or page member (Fig. 3). If the signal is not present, the roller 22 continues operation (block 152). If the signal is present, the solenoid 70 is deenergized (block 156). The system will wait (block 158) for a predetermined time period until the cover or inner page member 102 is positioned on the roller support member 24 (Fig. 4). After the predetermined time period has elapsed, the roller 22 is disabled (block 160) (Fig. 9B) and the feed rollers 32, 34 (Fig. 5) are operated (block 162) to move the passbook member in a direction enabling the stationary roller 22 to rotate the cover or inner page member to a fully opened position. The system will check the output of the photodetector 106 to see if the turning of the cover or inner page member 102 has been completed (block 164). If the turning operation has not been completed, the passbook member 72 is moved further to a position (block 166)

where the turning of the cover or inner page member is completed. If the turning operation has been completed, the passbook member is transmitted (block 168) either to a printing station or to a completed turning position where the passbook is held in an open position which completes the page turning operation.

It will be seen from this construction that a passbook member in a closed position can be processed automatically to allow printing to occur on the cover member and the inner page members. This allows the page turning mechanism to be employed in ATM's or other remote facilities which do not require the presence of a bank clerk or other type of operator.

Claims

1. Document page turning apparatus, including feeding means (32, 42) adapted to feed a multiple page document (72) along a feed path to a turning station (20), document bowing means (44) adapted when actuated to engage and move a document (72) positioned at said turning station (20) to a bowed configuration, turning means (22) adapted to engage the top page (102) of a bowed document (72) and operable to move said top page (102) to a partially open position adjacent said turning means (22), and control means (32—42) to feed the document along said feed path such that said turning means (22) engages and moves the partially opened top page (102) to a fully open position, characterized in that said document is a passbook (72) having a relatively thick cover and relatively thin inner pages, in that sensing means (74, 76, 78) coupled to said control means (80) are provided adjacent said feed path, adapted to sense whether said passbook is in a closed or an open condition, and in that said control means (80) is adapted to cause said drive plate member (44) to be operated with a relatively high or a relatively low pressure level according as said passbook is in a closed or an open condition.

2. Document page turning apparatus according to claim 1, characterized in that said feeding means includes a pair of rollers (34, 40) adapted to engage and hold an edge of said document (72) when said document (72) is located in said turning station (20).

3. Document page turning apparatus according to claim 2, characterized in that said document bowing means includes a drive plate member (44) mounted for movement in a direction perpendicular to said feed path.

4. Document page turning apparatus according to claim 3, characterized in that the drive plate member (44) is of a generally arcuate shape.

5. Document page turning apparatus according to claim 4, characterized in that said drive plate member (44) is adapted to be actuated by electromagnetic driv means (70) coupled to said plate member (44) by a linkage including a plurality of rotatably mounted link members (54, 56).

6. Document page turning apparatus according to claim 5, characterized in that said electromagnetic drive means includes a solenoid operable by a solenoid control circuit (122, 124) adapted to selectively control the pressure exerted by said drive plate member (44) on said document (72) to avoid relatively high or relatively low pressure levels.

7. Document page turning apparatus according to claim 1, characterized in that said turning means includes a page turning roller (22) rotatable to move said top page (102) to said partially open position and, by a sensing device (104, 106) coupled to said control means (80), said control means (80) being adapted, when said top page (102) has been moved a predetermined amount, to cause said document bowing means (44) and said page turning roller (22) to be deactuated, and to render said feeding means (32—42) operative to move said document (72) along said feed path, whereby said top page (102) is moved to the fully open position.

8. Document page turning apparatus according to claim 7, characterized in that said page turning roller (22) is controllable to rotate in a forward or a reverse direction of rotation and is mounted for movement between alternative locations adjacent said feed path, whereby pages may be turned in a selected direction of turning.

Patentansprüche

1. Belegseiten-Wendegerät mit Fördervorrichtungen (32, 42) die geeignet sind, einem Vielseitenbeleg (72) längs eines Förderweges zu einer Wendestation (20) zu fördern, mit einer Belegbiegevorrichtung (44), die bei Betätigung geeignet ist, mit einem an der Wendestation (20) angeordneten Beleg in Eingriff zu gehen und diesen in eine gebogene Form zu bewegen, eine Wendevorrichtung (22), die geeignet ist, mit der Oberseite (102) eines gebogenen Belegs (72) in Eingriff zu gehen, und betätigbar ist, um die Oberseite (102) in eine teilweise offene Position benachbart zu der Wendevorrichtung (22) zu bewegen, und eine Steuervorrichtung (80), die geeignet ist, die Fördervorrichtungen (32—42) zu betätigen, um den Beleg längs des Förderweges derart zu fördern, daß die Wendevorrichtung (22) mit der teilweise offenen oberen Seite (102) in Eingriff geht und diese in eine vollständig offene Position bewegt, dadurch gekennzeichnet, daß der Beleg ein Paßbuch (72) mit einem verhältnismäßig dicken Deckel und verhältnismäßig dünnen inneren Seiten ist, daß Abtastvorrichtungen (74, 76, 78), die mit der Steuervorrichtung (80) gekoppelt sind, benachbart zum Förderweg angeordnet und geeignet sind abzufühlen, ob sich das Paßbuch in einem geschlossenen oder offenen Zustand befindet, und daß die Steuervorrichtung (80) geeignet ist, die Elektromagnet-Steuerschaltung (122, 124) zu steuern, um das Antriebsplattenglied (44) mit einem verhältnismäßig hohen oder verhältnismäßig niedrigem Druckwert zu betätigen abhängig davon, ob das Paß-

buch in einem geschlossenen oder einem offenen Zustand ist.

2. Belegseiten-Wendegerät nach Anspruch 1, dadurch gekennzeichnet, daß die Fördervorrichtungen ein paar von Rollen (34, 40) aufweisen, das geeignet ist, mit einer Kante des Belegs (72) in Eingriff zu gehen und diese zu halten, wenn der Beleg (22) sich in der Wendestation (20) befindet.

3. Belegseiten-Wendegerät nach Anspruch 2, dadurch gekennzeichnet, daß die Belegbiegevorrichtung ein Antriebsplattenglied (44) aufweist, das zur Bewegung in einer Richtung senkrecht zu dem Förderweg angebracht ist.

4. Belegseiten-Wendegerät nach Anspruch 3, dadurch gekennzeichnet, daß das Antriebsplattenglied (44) eine durchgehend gewölbte Form aufweist.

5. Belegseiten-Wendegerät nach Anspruch 4, dadurch gekennzeichnet, daß das Antriebsplattenglied (44) geeignet ist, durch eine elektromagnetische Treibervorrichtung (70) betätigt zu werden, die mit dem Plattenglied (44) durch eine Gelenkverbindung mit einer Vielzahl von drehbar gelagerten Gelenkelementen (54, 56) gekoppelt ist.

6. Belegseiten-Wendegerät nach Anspruch 5, dadurch gekennzeichnet, daß die elektromagnetische Treibervorrichtung einen Elektromagneten aufweist, der batätigbar ist durch eine Elektromagnet-Steuerschaltung (122, 124), die geeignet ist, den durch das Antriebsplattenglied (44) auf den Beleg (72) ausgeübten Druck auswählbar zum verhältnismäßig hohen oder verhältnismäßig niedrigem Druckwert zu steuern.

7. Belegseiten-Wendegerät nach Anspruch 1, dadurch gekennzeichnet, daß die Wendevorrichtung eine Seitenwenderolle (22) aufweist, die drehbar ist, um die obere Seite (102) in eine teilweise offene Position zu bewegen, und durch eine mit der Steuervorrichtung (80) gekoppelte Abtastvorrichtung (104, 106), wobei die Steuervorrichtung (80) geeignet ist, wenn die obere Seite (102) um einen vorbestimmten Betrag bewegt wurde, die Deaktivierung der Belegbiegevorrichtung (44) und der Seitenwenderolle (22) zu bewirken und die Fördervorrichtungen (32—42) in Betrieb zu setzen, um den Beleg (72) längs des Förderweges zu fördern, wodurch die obere Seite (102) in die vollständig offene Position bewegt wird.

8. Belegseiten-Wendegerät nach Anspruch 7, dadurch gekennzeichnet, daß die Seitenwenderolle (22) steuerbar ist, um in einer Vorwärts- oder einer Rückwärtsrichtung zu drehen, und angeordnet ist zur Bewegung zwischen alternativen Positionen benachbart zum Förderweg, wodurch Seiten in einer gewählten Wenderichtung gewendet werden können.

Revendications

1. Appareil à tourner les pages de documents, comprenant des moyens d'avance (32, 42) conçus pour faire avancer un document (72) à plusieurs

pages le long d'un trajet d'avance vers un poste (20) de retournement, des moyens (44) de bombardement de documents conçus, lorsqu'ils sont actionnés, pour prendre un document (72), placé dans ledit poste de retournement (20), et lui donner une configuration bombée, des moyens (22) de retournement conçus pour prendre la page de dessus (102) d'un document bombé (72) et pouvant être actionnés pour amener ladite page de dessus (102) dans une position partiellement ouverte adjacente auxdits moyens de retournement (22), et des moyens de commande (80) conçus pour actionner lesdits moyens d'avance (32—42) afin de faire avancer le document le long dudit trajet d'avance de manière que lesdits moyens de retournement (22) prennent la page de dessus, partiellement ouverte (102), et l'amènent dans une position totalement ouverte, caractérisé en ce que ledit document est un livret (72) ayant une couverture relativement épaisse et des pages intérieures relativement minces, en ce que des moyens de détection (74, 76, 78) accouplés auxdits moyens de commande (80), sont prévus à proximité immédiate dudit trajet d'avance, conçus pour détecter si ledit livret est dans un état fermé ou dans un état ouvert, et en ce que lesdits moyens de commande (80) sont conçus pour commander ledit circuit (122, 124) de commande de bobine afin d'actionner ledit élément à plaque d'entraînement (44) avec un niveau de pression relativement élevé ou relativement bas selon que ledit livret est dans un état fermé ou dans un état ouvert.

2. Appareil à tourner les pages de documents selon la revendication 1, caractérisé en ce que lesdits moyens d'avance comprennent deux rouleaux (34, 40) conçus pour prendre et maintenir un bord dudit document (72) lorsque ledit document (72) est placé dans ledit poste (20) de retournement.

3. Appareil à tourner les pages de documents selon la revendication 2, caractérisé en ce que lesdits moyens de bombardement de documents comprennent un élément à plaque d'entraînement (44) monté de façon à se déplacer dans une direction perpendiculaire audit trajet d'avance.

4. Appareil à tourner les pages de documents selon la revendication 3, caractérisé en ce que

l'élément à plaque d'entraînement (44) est de forme globalement courbée.

5. Appareil à tourner les pages de documents selon la revendication 4, caractérisé en ce que ledit élément à plaque d'entraînement (44) est conçu pour être actionné par des moyens d'entraînement électromagnétiques (70) accouplés audit élément à plaque (44) par un tringlage comprenant plusieurs bielettes (54, 56) montées de façon à pouvoir tourner.

6. Appareil à tourner les pages de documents selon la revendication 5, caractérisé en ce que lesdits moyens d'entraînement électromagnétiques comprennent une bobine pouvant être actionnée par un circuit de commande de bobine (122, 124) conçu pour commander la pression exercée par ledit élément à plaque d'entraînement (44) sur ledit document (72) sélectivement audit niveau de pression relativement élevé relativement bas.

7. Appareil à tourner les pages de documents selon la revendication 1, caractérisé en ce que lesdits moyens de retournement comprennent un rouleau (22) à tourner les pages, pouvant être mis en rotation afin d'amener ladite page de dessus (102) dans ladite position partiellement ouverte et, par un dispositif de détection (104, 106) couplé auxdits moyens de commande (80), lesdits moyens de commande (80) étant conçus pour, lorsque ladite page de dessus (102) a été déplacée d'une distance prédéterminée, pour mettre hors d'action lesdits moyens (44) de bombardement de documents et ledit rouleau (22) à tourner les pages, et pour mettre en action lesdits moyens d'avance (32—42) afin de déplacer ledit document (72) le long dudit trajet d'avance, de manière que ladite page de dessus (102) soit amenée dans la position totalement ouverte.

8. Appareil à tourner les pages de documents selon la revendication 7, caractérisé en ce que ledit rouleau (22) à tourner les pages peut être commandé afin de tourner dans un des sens de rotation en avant ou en arrière et est monté de façon à se déplacer entre des emplacements alternés, à proximité immédiate dudit trajet d'avance, de manière que des pages puissent être tournées dans un sens choisi de retournement.

0 157 835

FIG. 1

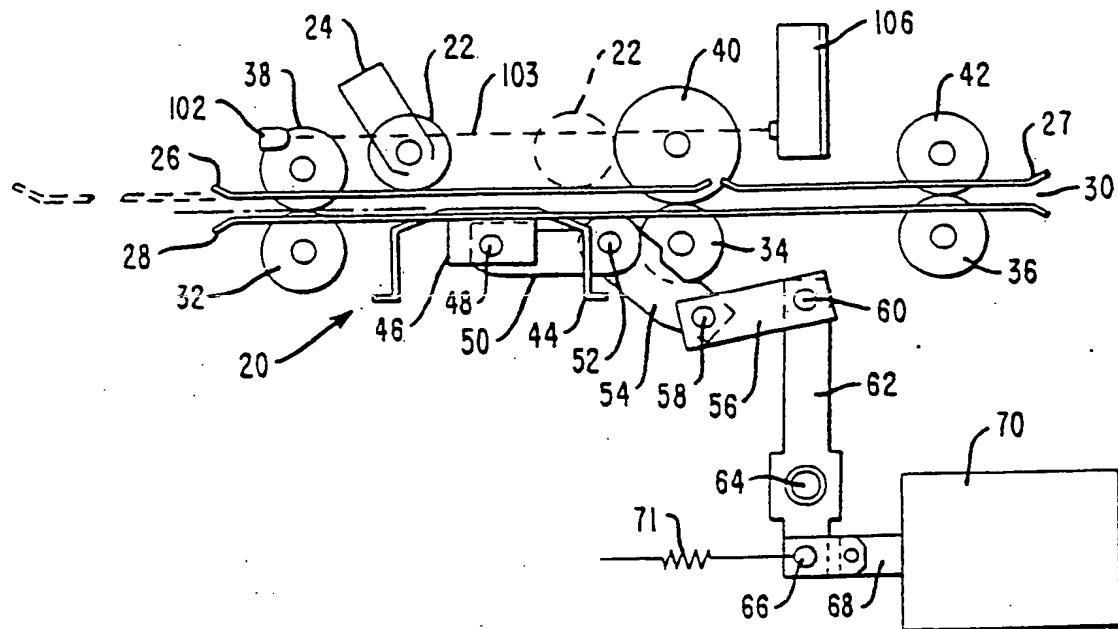
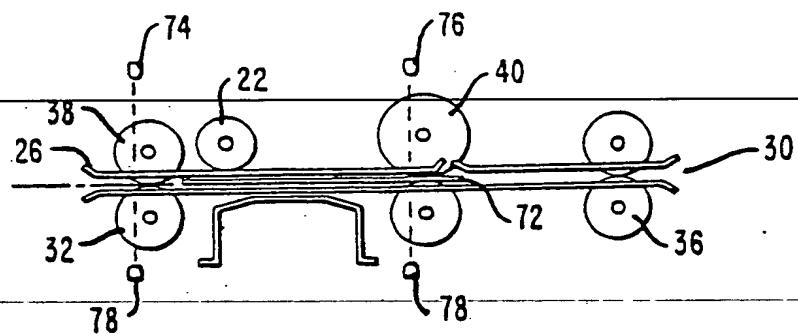


FIG. 2



0 157 835

FIG. 3

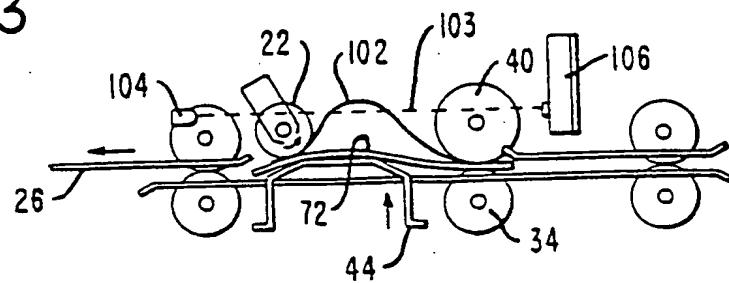


FIG. 4

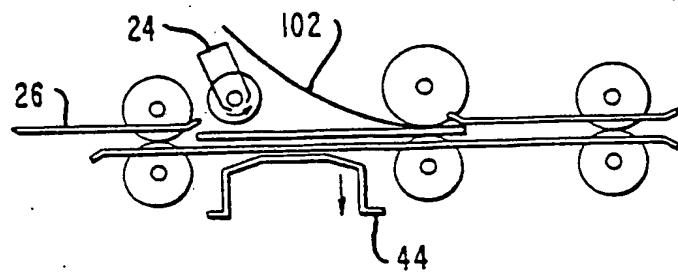


FIG. 5

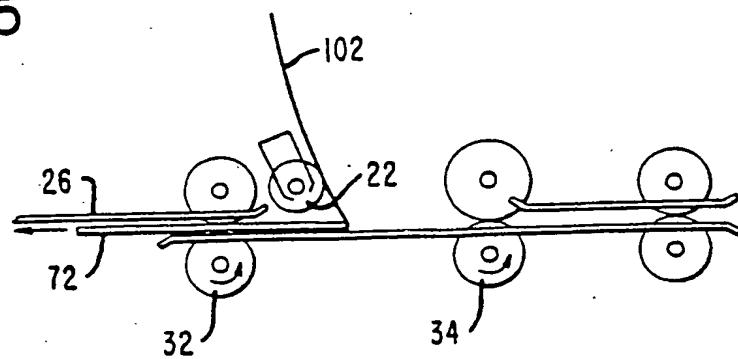


FIG. 6

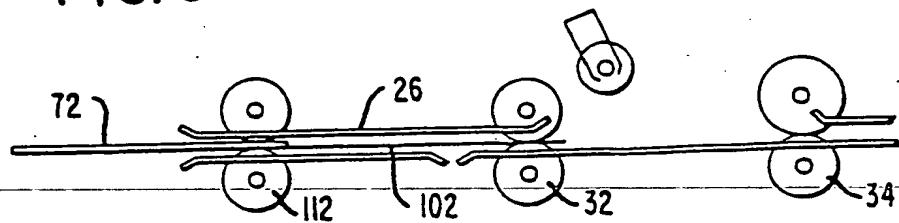


FIG. 7

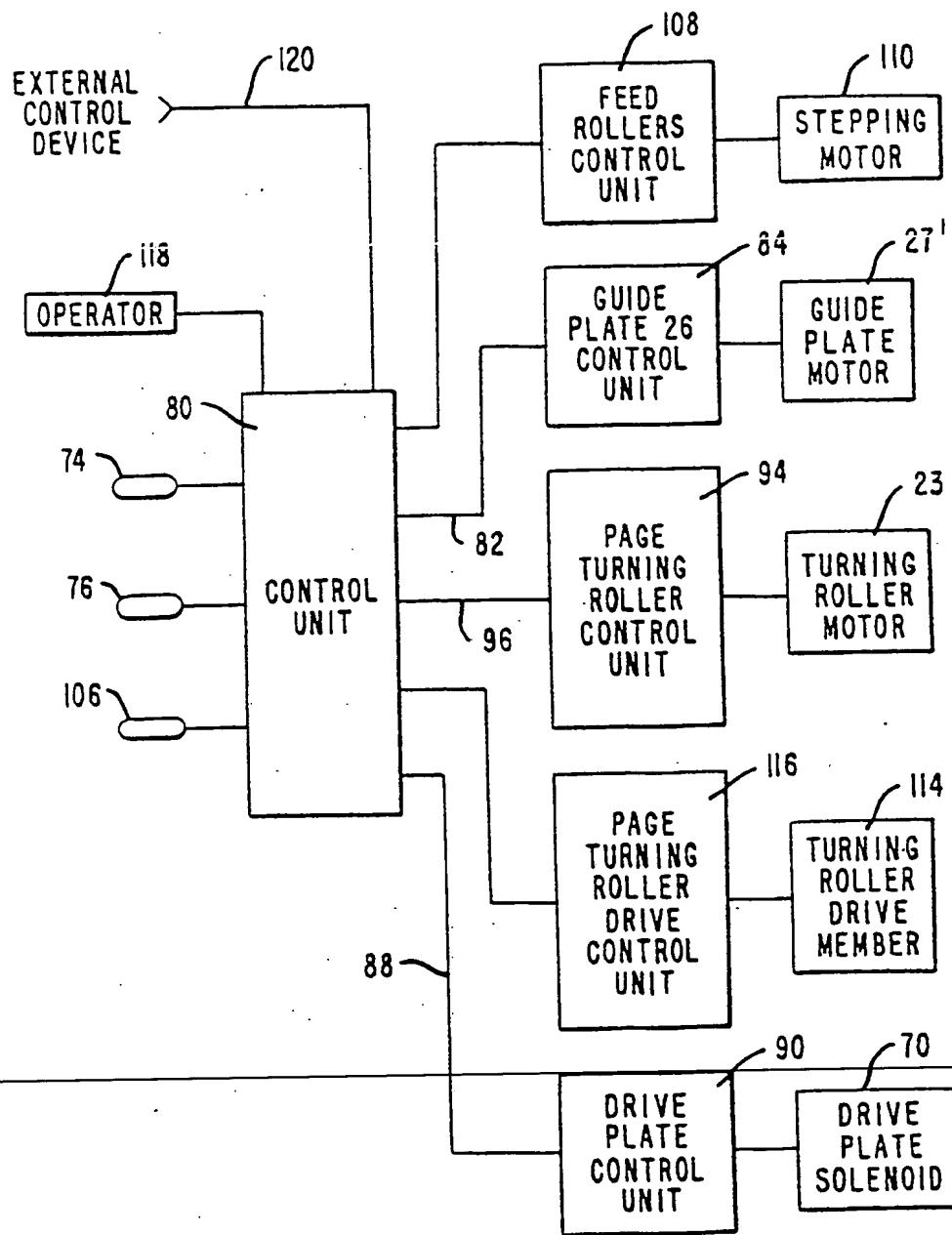


FIG. 8

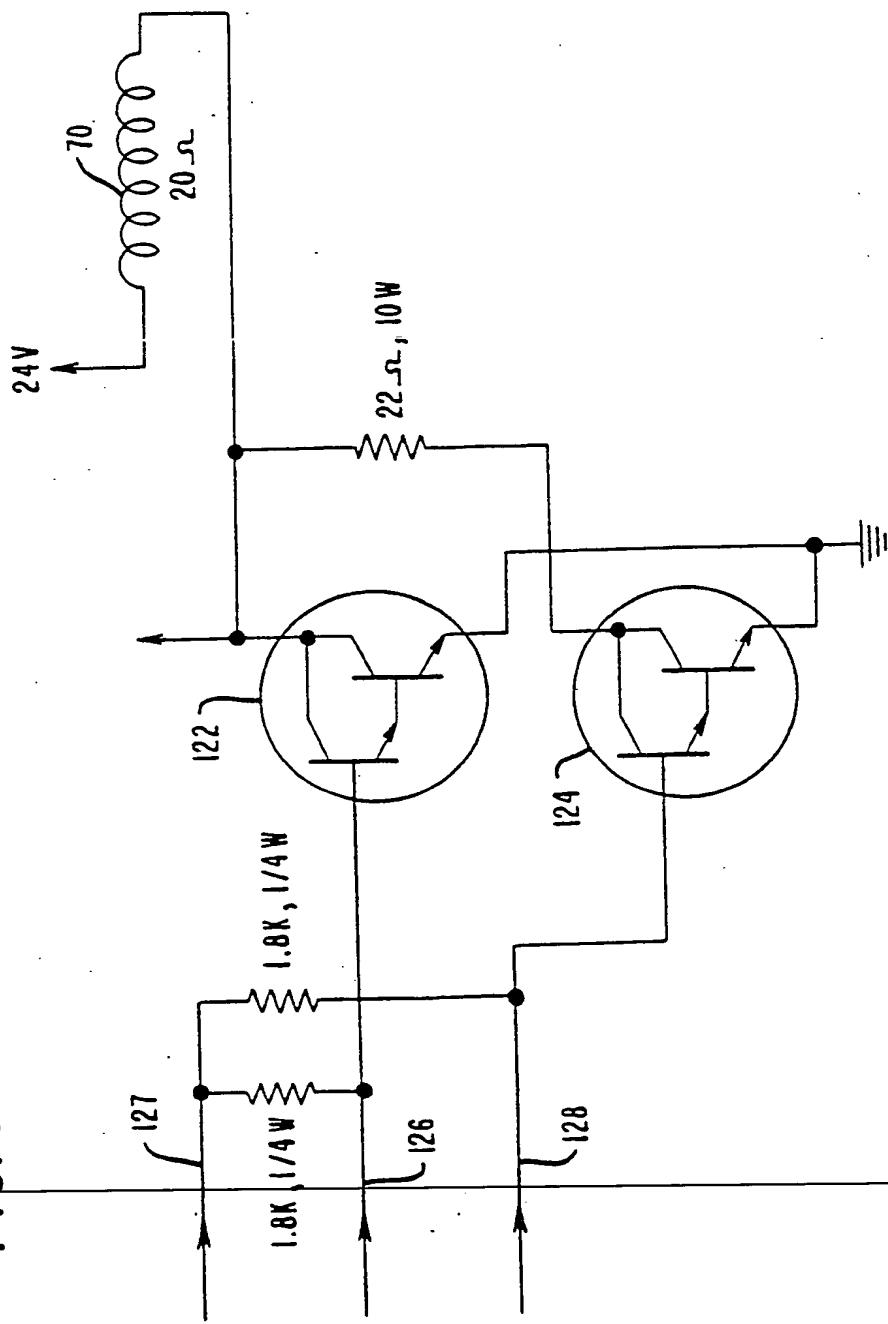
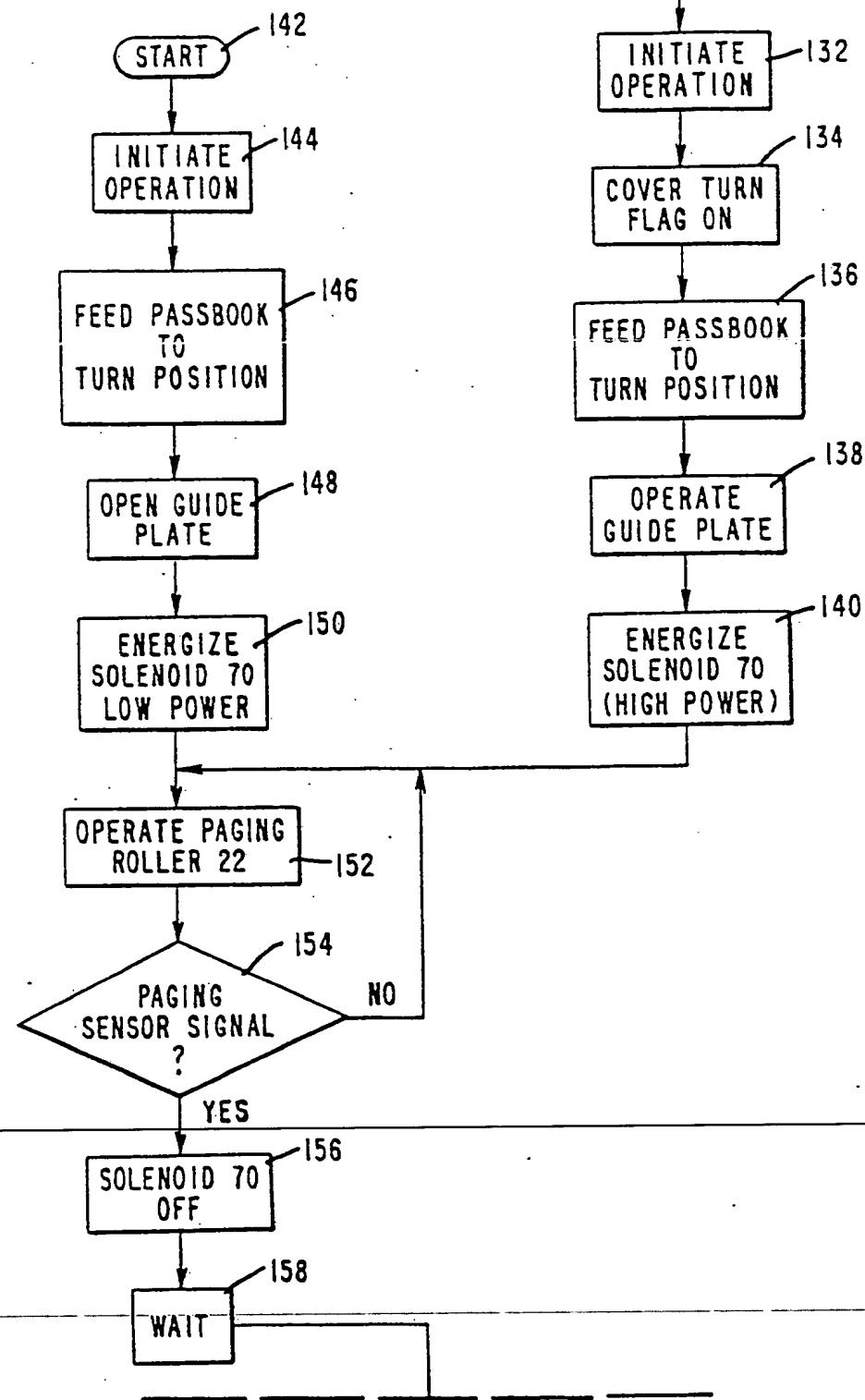


FIG. 9A



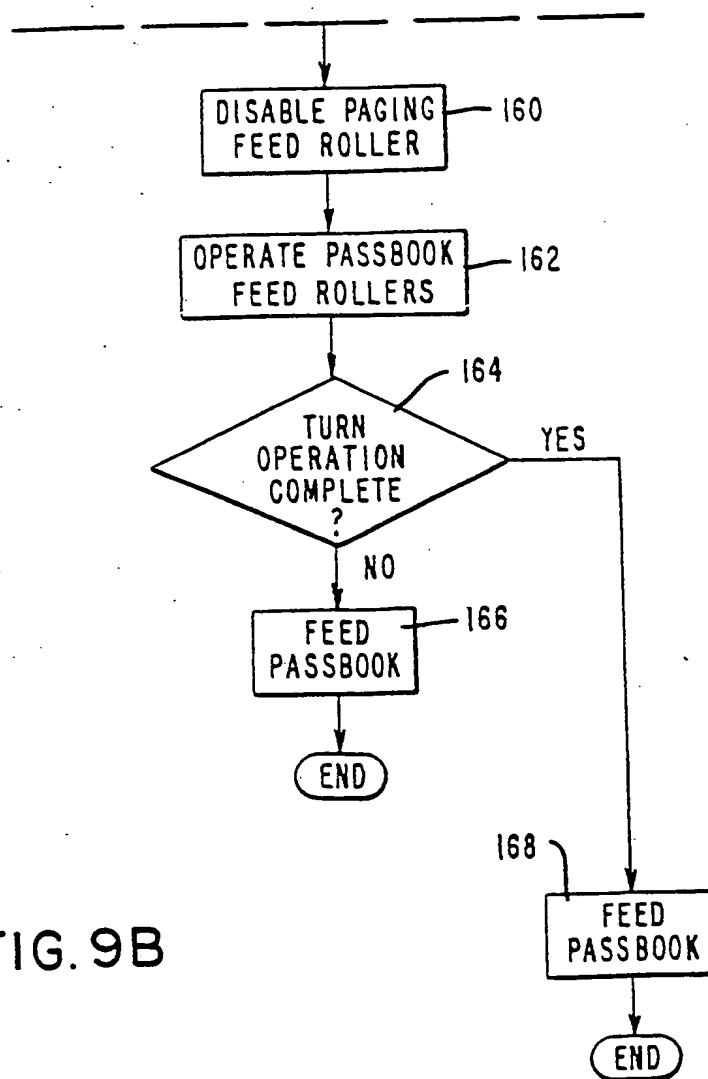


FIG. 9B